



Carus Chemical Company

AQUACULTURE OVERVIEW Permanganate Products and Uses

U.S. Fish & Wildlife Service
11th Annual Drug Approval Coordination Workshop

2-3 August 2005
Bozeman, MT



Responsible Care[®]
Good Chemistry at Work

1-800-435-6856
www.caruschem.com



Objectives

- "Re-introduce" Carus Chemical Company and our permanganate products
- Review common end-use applications by market segments
- Exchange information on the domestic and global aquaculture markets



Carus Chemical Company



Peru, IL

- Corporate Headquarters,
- Administration
- Sales and Marketing

La Salle, IL

- Manufacturing
- Technology



Trubia, Spain

- Manufacturing
- Sales and Marketing





Carus Chemical Company Overview

Carus Chemical Company is

- Small to midsize inorganic chemical manufacturer
 - 210 employees
- Privately held; founded in 1915
- Production sites - LaSalle, IL, USA and Trubia, Spain
- Manufacturing/Supply Chain in Asia
- Technology strengths are
 - Oxidation Chemistry
 - Manganese Chemistry
 - Permanganate Chemistry
 - Phosphate Chemistry
 - Permanganate Feed Equipment



Carus Chemical Company Overview

Veterinary uses for oxidants have been around for a long time,
but Carus Chemical Company is not a . . .

- Pharmaceutical Company
 - We are unfamiliar with FDA reporting, filing, documentation, master files, terminology, etc.
 - We do not have staff (person) that deals solely with FDA documentation
 - We do not have a biological research lab or biologists on staff
 - We do not conduct R&D programs to develop new drugs



Goal: Profitable Growth



Our business strategy is to grow in three ways

- Maintain, Strengthen, and Expand Core Businesses
 - Permanganates
 - Phosphates
- Acquisitions and Joint Ventures
 - International
 - Product Lines
- Establish New Technology-based Business
 - Rechargeable battery cathode - lithium manganese dioxide
 - Manganese oxide catalyst for gas purification



Market Focus



Our core business is directed toward three markets:

- **Municipal Processes**
 - Drinking water purification
 - Sanitary wastewater treatment and odor destruction
- **Industrial Applications**
 - Chemical synthesis and purification
 - Metal surface cleaning
 - Printed circuit board etching
 - Aquaculture/agriculture
 - Mining/hydrometallurgical
- **Environmental Pollution Control Uses**
 - Wet/Dry scrubbing
 - Catalytic carbon monoxide, solvent, ozone destruction
 - In-situ chemical oxidation of TCE/PCE cleaning solvents



Authorized Distributors - Our Route to Market



We have over 40 years of experience selling through full-service chemical distributors

- Over 75 % of our product volume is sold through 136 authorized distributor branches
- Most end-use customers use less-than-truckload volumes



Innovative Products

Liquid Permanganates

Low Volume - Specialty Products
Sold Directly by Separate Carus
Business Units

Value-Added Permanganates Sold
through Distributors

Electronics/Pharmaceutical

LIQUOX[®] EG Etchant
40 % Concentration
Low impurities (i.e. Ca^{2+} , Cl^-)

Drinking Water

CARUSOL[®] Liquid Permanganate
20 % Concentration
Certified to ANSI/NSF Standard 60

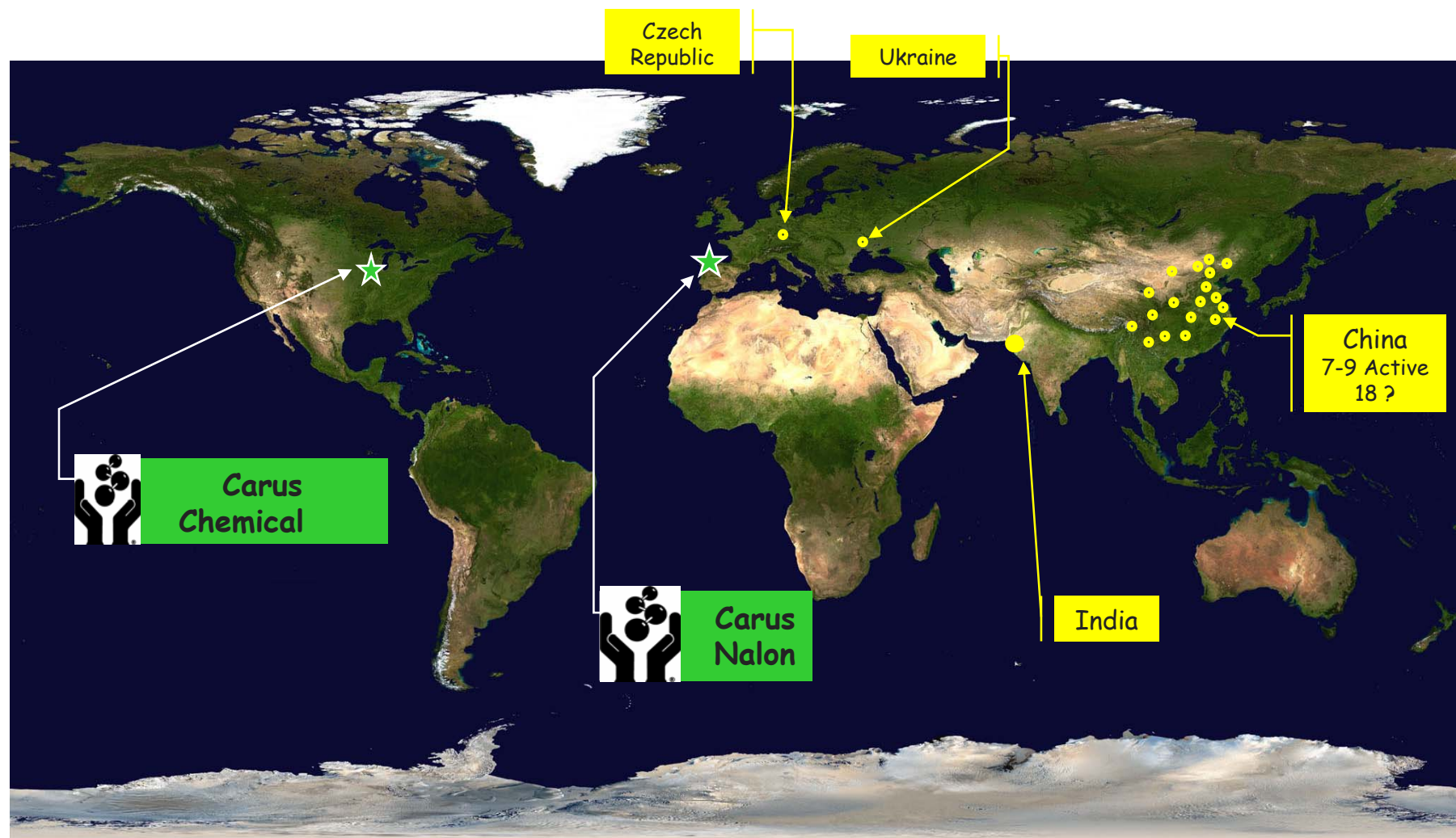
Hazardous Waste Remediation

RemOx[™] ISCO Reagent (liquid)
40 % Concentration
Low Heavy Metals

Wastewater

ECONOX[®] Liquid Permanganate
17-19 % Concentration

World Potassium Permanganate Market





Aquaculture Uses for CAIROX[®] Potassium Permanganate

The common uses for permanganate in aquaculture

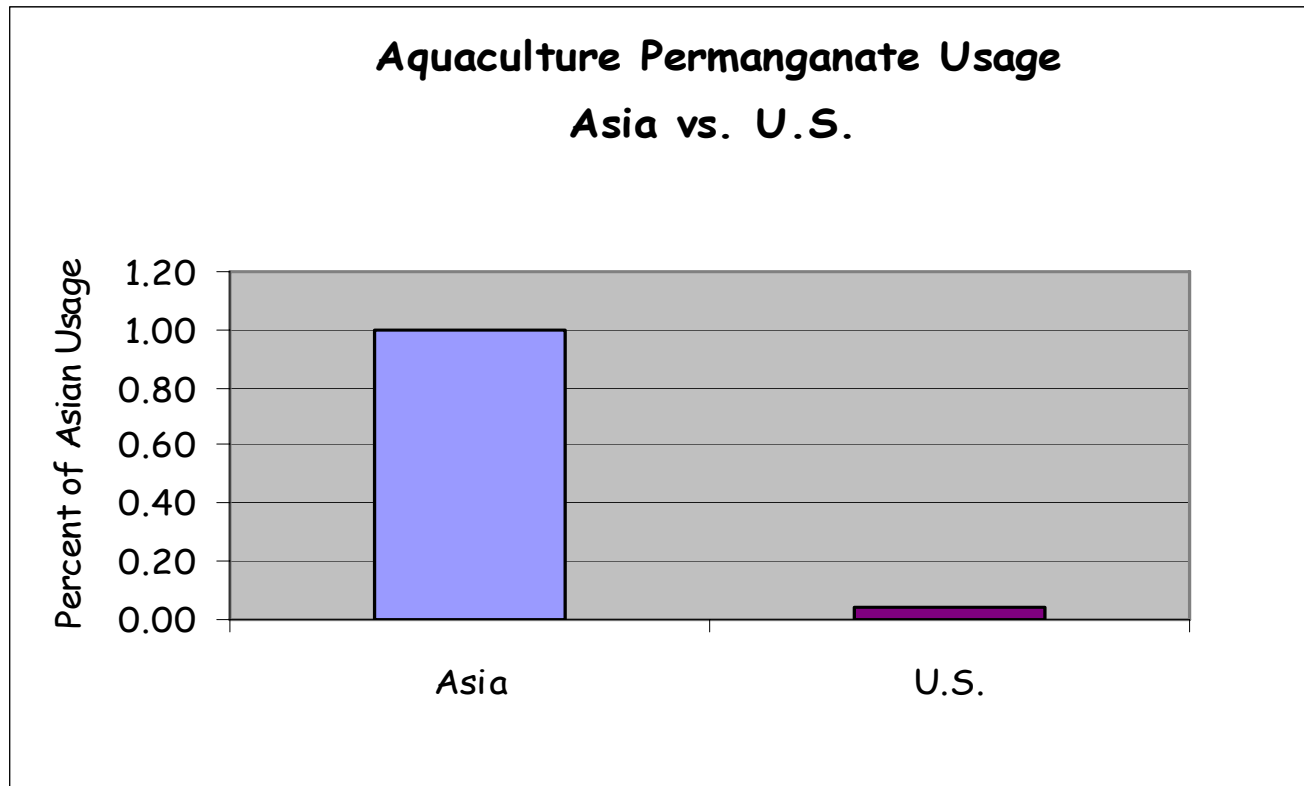
- Aiding Dissolved Oxygen Replenishment
 - Destroys organic material that consumes oxygen
 - Natural aeration processes replenish the dissolved oxygen levels
- Controlling Diseases
 - External columnaris (finfish)
 - External protozoan parasites (fresh water finfish)
 - Bacterial gill disease (fresh water salmonids)
 - External cold water disease (fresh water salmonids)
- Clarifying Pond Water
 - Destroys organic material and oxidizes iron and manganese
 - Co-product manganese dioxide will precipitate; acts as a coagulant aid
- Neutralizing Rotenone
 - Rotenone is a fish poison that is eliminated by permanganate
 - Pond can be restocked quickly
- Preventing Algal Growth
 - Oxidizes many fish neurotoxins



Aquaculture Permanganate Use Asian vs. U.S.

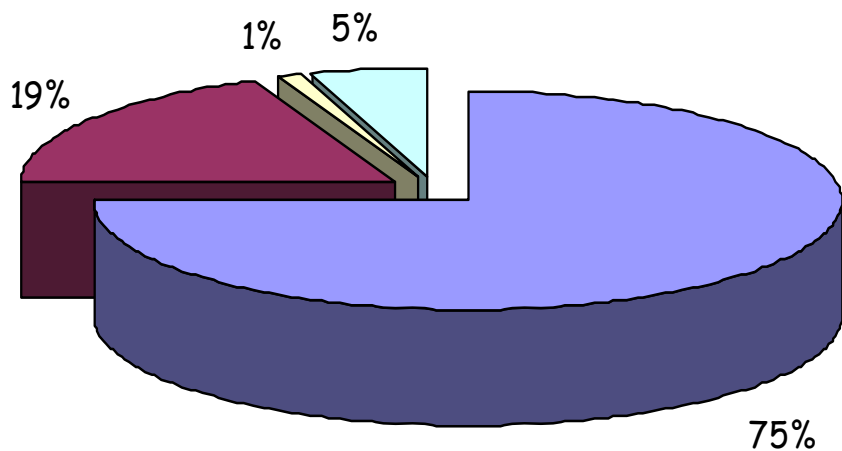


Globally, permanganate is used successfully in emerging markets to protect "shrimp" ("prawns") . . .



Sales Volume by Markets

Aquaculture is a small segment of our total permanganate business



■ Municipal ■ Industrial ■ Aquaculture ■ Environmental

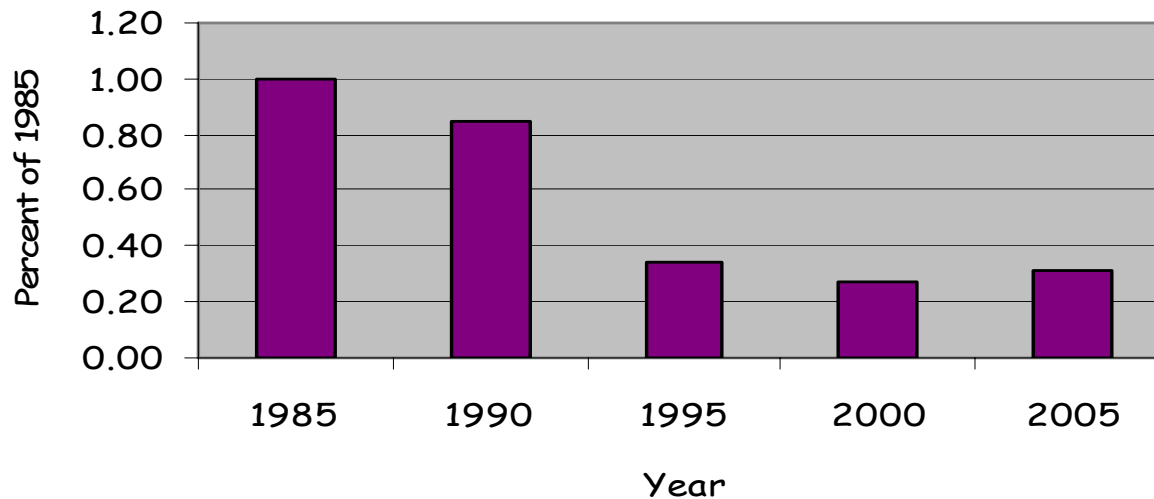


U.S. Aquaculture Permanganate Use Trend



We now view aquaculture as a steady market, but not a growth market

U.S. Aquaculture Permanganate Sales Trend





Indirect Positive Impact on the Aquatic Environment

There are several uses of permanganate that indirectly improve the aquatic environment

- Treatment of Acidic Mine Drainage
 - Oxidizes iron and manganese
- Treatment of animal waste (manure) from confined animal feed operations
 - Oxidizes organic compounds
 - Destroys high oxygen demand reduced sulfur compounds
- Others
 - Municipal and industrial wastewater treatment
 - Destroys toxic compounds



Questions?